

Instruction manual

bon E-40



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Appendix: EC Declaration of conformity

1 Introduction

Dear customer

Thank you for purchasing our refraction unit bon E-40. Please read the operating instructions carefully before using the system. Keep these instruction manual safe for future use. **Please observe the safety instructions.**

If you have any further questions, please contact our customer helpline.

Meaning of the symbols in the operating instructions



Caution! Please observe safety instructions with this symbol to prevent personal danger or damage to property.



Important! Indicates particularly important information to maintain the function of the device/system or to extend its life.



Note! Indicates information for correct use so that errors may be avoided.

2 Important information

Manufacturer: bon Optic Vertriebsgesellschaft mbH · Stellmacherstr. 14 · D- 23556 Lübeck

2.1 Information about the device

Name of device: bon E-40

2.2 Application and classification

The refraction unit bon E-40 serves as a carrier to which ophthalmological devices such as slit lamps and ophthalmometers can be attached. These devices may be adjusted in front of the patient who came for a medical examination.

The refraction unit bon E-40 is a Class 1 non-invasive, active medical device in accordance with the classification regulations of Directive 93/42/EEG on medical devices (MDD).

2.3 Liability

The refraction unit is manufactured according to the current technical status and the recognised safety regulations and is tested in accordance with strict quality criteria. bon Optic accepts liability for the safety, reliability and performance of the device if

- installation and any changes or repairs have been carried out by a person authorised by bon Optic to do so.
- the power supply to which the device is connected corresponds to the national legislation.
- the device is operated in accordance with these operating instructions.
- the operator complies to the ordinance on the Operation of Medical Devices (MPBetreibV).

If the system is assembled, changed or repaired by an unauthorised person, if it is improperly maintained or not used as described in 2.2, the manufacturer is no longer liable.

2.4 Scope of delivery

1 x refraction unit bon E-40 as per agreed equipment

1 x remote control

1 x mains cable (for equipment types without wall terminal box)

1 x instruction manual

3 Safety instructions

Please follow the legal requirements on accident prevention and observe the following safety instructions!

Setting-up and assembly:

- The refraction unit should not be assembled and operated in damp rooms.
- Ensure that the device is on a level and stable surface during assembly.
- The mains voltage must be the same as stated on the product label.
- The max. weight-bearing capacity of the exchangeable table (3) is 30 kg/device station.

Operation:

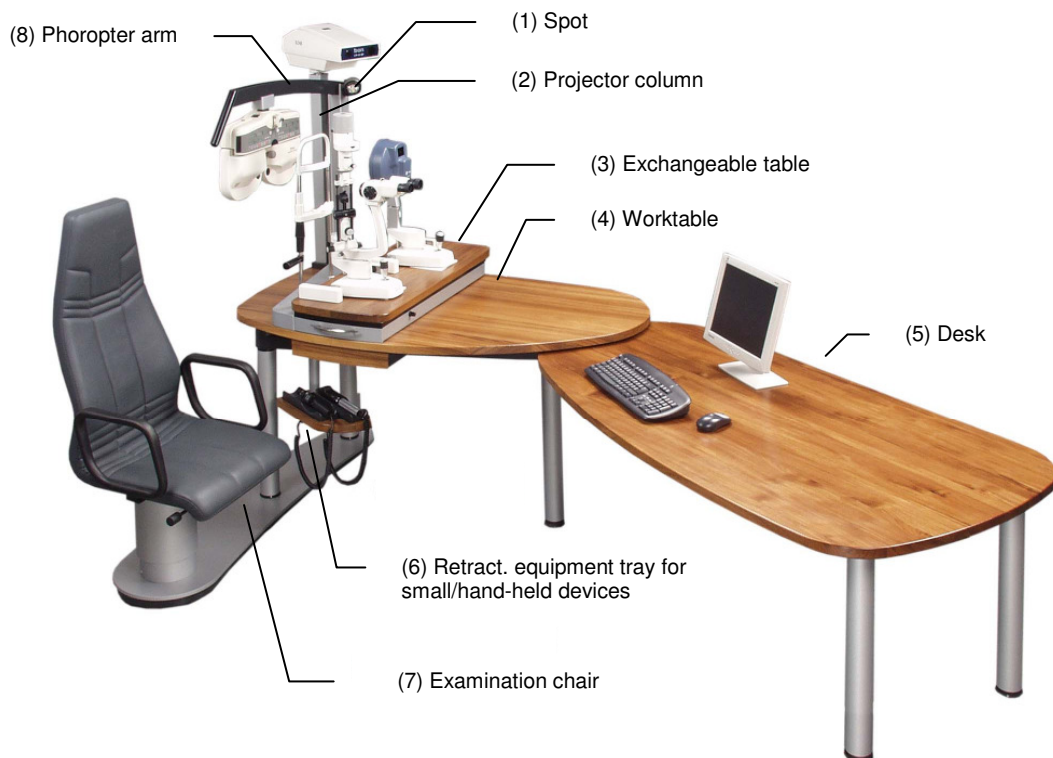
- Do not expose the system to extremes of temperatures. It is recommended that the product be used at temperatures of between +10° C and +40° C.
- Avoid dropping or splashing water on the device.
- The max. weight-bearing capacity of the examination chair (7) of 170 kg must not be exceeded.
- Ensure that the patient keeps his/her hands away from the exchangeable table. There is a risk of pinching body parts!
- The examination chair is not suitable for continuous operation. After continuous operation of 60 seconds, wait at least 9 minutes for the device to cool down.
- If the working place lamp (1) is used for a long time span, the housing will get hot. You could be burned!

Other information:

- Do not pull on the power cable in order to remove the plug from the socket (this applies to equipment types without wall terminal boxes).
- Run all cables properly to prevent people from stepping on them or tripping over them. Ensure that no damage occurs to the cable (e.g. sharp edges, excessive heat).
- Before doing any repairs, maintenance or installation work always pull out the mains plug.

4 Description of device

Main components (max. number of components)



Characteristics of refraction unit:

- Extendable phoropter arm (8).
- Exchangeable table (3) for positioning ophthalmologic devices in front of the patient.
- Examination chair (7) with electric lifting motor and with hinged left armrest and horizontally adjustable chair.
- Retractable equipment tray (6) with automatic switch-off facility for these devices.
- Projector column (2) with recess for optotype projector.
- Reading illumination (1).
- Large-surface worktable (4)
- Large desk (5)
- Trial lens tray
- Control is also possible with remote control.

Electrical connection of refraction unit is by a shockproof socket or a wall terminal box.

5 Setting-up, assembly and repair

Expert staff from bon Optic or your distributor will set up and assemble the refraction unit.

Changes or repairs to the refraction unit may only be carried out by persons authorised by bon Optic. Medical devices that are linked to the electricity supply of the refraction unit must be shown to comply with DIN EN / IEC specifications. All configurations must meet the requirements of the DIN EN 60601-1-1 (IEC 601-1) standard. Non-electrical devices that are connected to the unit must not affect the safety level of the unit. Changes to the refraction unit must not endanger patients, users and the surroundings.

Repairs that can be carried out without a technician can be found in Chapter 8: Maintenance and care

6 Operation

6.1 Controls

The refractions unit may either be controlled by means of the operating keyboard on the exchangeable board or by the remote control.

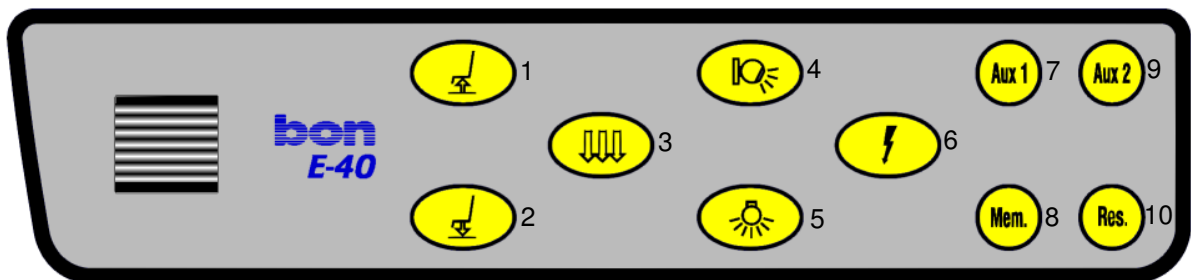


Abbildung 6-1: Control panel

- | | | |
|-------------------------|----------------------------|----------------------------|
| 1 Chair up | 5 Dimmer roomlight | 9 Switch for other devices |
| 2 Chair down | 6 Switch on/off unit | 10 Reserve |
| 3 Chair down completely | 7 Switch for other devices | |
| 4 Dimmer spotlight | 8 Memory switch | |

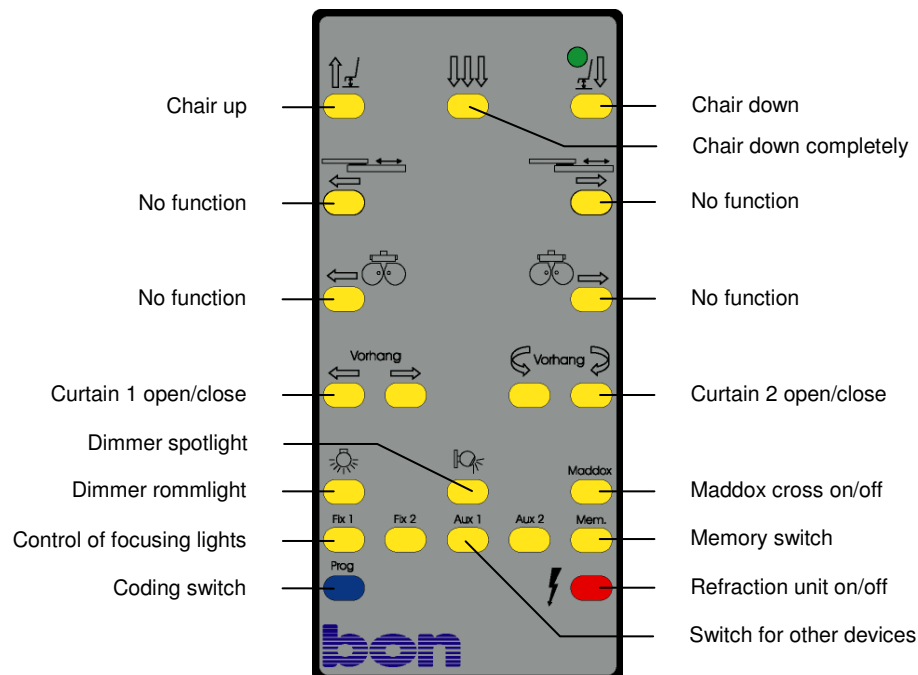


Abbildung 6-2: Remote control

6.2 Initial start-up

a) without wall terminal box.

Plug the supplied power cable of the refraction unit into the mains socket. The socket of the refraction unit is on the back table leg.

b) with wall terminal box.

Activate the on-/off-switch on the wall terminal box.

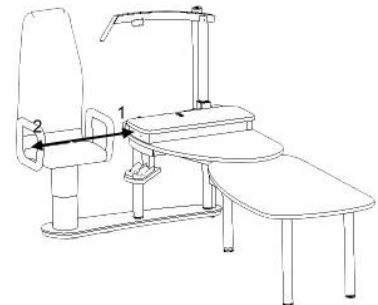
- Press the on/off button on the control panel or on the remote control in order to switch on the refraction unit.
- The green pilot lamp on the control panel lights up.
- The refraction unit is now ready for operation.

6.3 Control of components

6.3.1 Exchangeable table

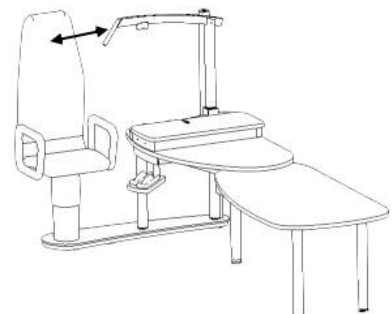
Move the exchangeable table by hand, in order to change from position 1 to position 2. Move the device in front of the patient with the table device.

The appropriate device switched on automatically. At the control panel is a potentiometer for adjusting the brightness (for programming see chapter 7.4) of the table devices.



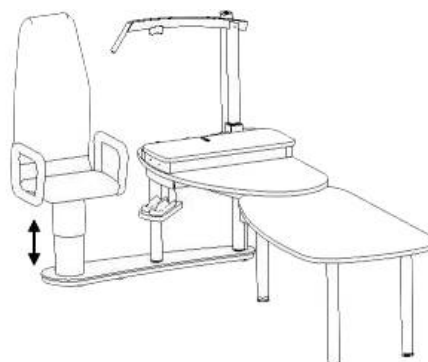
6.3.2 Phoropter arm


Pull at the handle bar, in order to bring the phoropter in front of the patient face.



6.3.3 Examination chair

Press the buttons/keys on the operating panel to move the examination chair forward or backward. Alternatively, you may also operate the examination chair by using the remote control.




With the  button/key, the examination chair will move down in its final position.

There is the option to install a foot switch for the functions up/down. For this purpose, please contact our customer service.


6.3.4 Retractable equipment tray for hand-held devices

Hand-held devices will switch on automatically when they are picked up from the retractable equipment tray.

6.3.5 Spotlight

Press the  button/key on the control panel in order to switch on/off the spotlight. Pressing this button down for some time will activate the dimmer function. The cycle changing from light to dark and back again to light will be repeated as long as the button/key is pressed down. Alternatively, you may also operate the spotlight by using the remote control.

6.3.6 Ambient light

Press the  button/key on the control panel in order to switch on/off the ambient light. Pressing this button/key down for some time will activate the dimmer function. The cycle changing from light to dark and back again to light will be repeated as long as the button/key is pressed down. Alternatively, you may also operate the ambient light by using the remote control.



We advise against using dimmers for fluorescent lamps.

6.3.7 Focussing lights, Maddox cross, extra buttons/keys

By pressing the buttons Fix 1 and Fix 2 of the remote control, the focusing lights are controlled, and pressing the maddox button will switch on/off the maddox cross provided that these lamps have been installed to the optional wall terminal box. You may, however, also control other devices by using these buttons.

In addition, there are the extra keys Aux 1, Aux 2 and Res. for controlling other devices.

6.4 Programming the ambient light

You may predefine the ambient light for 6 different operating positions. If the desired operating position has been selected (e.g. exchangeable table has been extended), the programmed level of ambient light will be selected automatically.


You may define the following operating positions for the ambient light:

No	Exch. table, pos. 1	Exch. table, pos. 2	Phoropter arm	Hand-held device 1	Hand-held device 2
1	x	x	x	x	x
2	●	x	x	x	x
3	x	●	x	x	x
4	x	x	●	x	x
5	x	x	x	●	x
6	x	x	x	x	●

x = inactive

● = active

Programming steps:

1. Bring the examination unit into the desired operating position (No. 1-6 of table).
2. Select the desired level of brightness for the ambient light by pressing the  button on the control panel or using the remote control.
3. Press down the **[Mem.]** button on the remote control until you hear a signal tone.
4. The selected brightness for the ambient light has now been memorised for this operating position.

Deleting the programming:

1. Bring the examination unit into the desired operating position (No. 1-6 of table).
2. Press down the **[Mem.]** button on the remote control until you hear two short signal tones.
3. The programmed ambient light level for this operating position has now been deleted.




By pressing the ambient light button, the brightness level may be changed any time. This will not affect the memorised value. However, if you switch off the ambient light, the automatic ambient light control will be deactivated. In order to re-activate the automatic ambient light control, the ambient light must first be switched on again.

7 Setup


If you want to start the set-up process, press the following key combination on the remote control:

[Fix 2] → [Maddox] → [Maddox] → [Fix 1]

You will hear a long and two short signal tones. To terminate the setup, you simply switch off the unit by pressing the  button.

7.1 Standby

The refraction unit may be switched off automatically after its last operation after a set time has elapsed.

1. Start the setup (cf. chapter 7).
2. Press the  button until you hear a signal tone. If you press the button repeatedly, the number of signal tones will increase. The following times for switching off the refraction unit can be set:

Signal tones	Switch-off time
1	15 min.
2	30 min.
3	1 h
4	2 h
5	4 h
6	8 h
7	off

3. To save the value, switch off the refraction unit.

7.2 Curtain control

By using the wall terminal box literally all kinds of curtain mechanisms and vertical blinds can be controlled. There are 5 different control options:

Mode	Function
1	Operation by depression of key; function is maintained as long as the key is pressed.
2	Switching operation (Relay switches to lock position).
3	Combination from mode 1 and mode 2: If the key/button is pressed longer than 3 seconds, the relay will switch into lock position.
4	Automatic control for curtains/systems with limit switches: In this mode, a) the running time b) the waiting time (optional) for the curtain are set. This makes sense as, for example, the curtain should not always completely open and close in between two examination. Application: 1. For first examination, the exchangeable table is moved forward. → Curtain closes when it reaches limit switch. 2. Exchangeable table is moved backward. → Curtain remains closed (waiting time, for example 1.5 minutes) 3. Hand-held device is removed for second examination. 4. Hand-held device is re-inserted into system → Curtain opens after the set running time of 1.5 minutes has elapsed.
5	Automatic control for curtains/systems without limit switches: Just as for mode 4, the running time applies to opening and closing of curtain. Select the running time for the curtain so that it is closed once the running time has elapsed.

There are two pairs of keys/buttons on the control for

- a) one curtain with two stepper motors or
- b) two curtains with one stepper motor.



Both pairs of keys/buttons can be programmed independently. If, however, both pairs of keys/buttons are in modes 4 or 5, the programmed times will apply to both pairs of keys/buttons.



Start the setup (cf. chapter 7).

In order to set the desired **mode** (1-5), press the left key/button (LLP or LRP) of the selected key/button pair.

The number of signal tones and the corresponding mode are the same. To save the value, switch off the unit.

The **running time** (1 to 7 seconds) is set by pressing the key/button RRP. The number of signal tones indicates the number of [set] seconds. To save the value, switch off the unit.

The delay (from 0 to 1.5 minutes) is set by pressing the RLP key/button (increase by 15-second increments). Here one signal tone means no delay, and 7 tones correspond to 1.5 minutes. To save the value, switch off the unit.

7.3 Fix 1, Fix 2, Aux 1, Aux 2

You may change the functions of key/buttons Fix 1, Fix 2, Aux 1 und Aux 2 from manual to automatic operation.

1. Start the setup (cf. chapter 7).
2. Press the corresponding key/button [Fix 1], [Fix 2], [Aux 1] or [Aux 2] until you hear one or two signal tones.

1 x signal tone = Function is carried out by depression of key [manually].

2 x signal tone = Function is carried out by automatic switching.

3. To save the value, switch off the refraction unit.

7.4 Supply voltage of devices

The control system of the refraction unit can produce a set supply voltage for the installed devices.

Ensure that your device is connected properly to the control system of the refraction unit.

Measure/check the supply voltage with a voltmeter directly on the power-consuming device.

Programming steps:

1. First reset the potentiometer (as far to the left as it will go). You find the potentiometer on the side underneath the exchangeable table.
2. Start the setup (cf. chapter 7).
3. Move the desired device into the operating position (e.g. pick up hand-held device from retractable equipment tray).
4. Select the supply voltage

6 V by pressing the button/key "chair up"

12 V by pressing the button/key "chair down"

on the remote control or on the control panel. For intermediate values of 3.5 volt or 8 volt, select the next highest voltage value. You will hear a short signal tone to acknowledge your setting.

If the potentiometer has not been reset, you will receive an error message. The abortion of the programming will be followed by 3 short tones. Start with step 1.

5. Slowly increase the supply voltage by turning up the potentiometer until you reach the desired supply voltage. Check the voltage with your voltmeter.



Ensure that you do not destroy the power-consuming device by applying an excess-voltage.

6. To save the set voltage, press the **[Mem.]** key/button on the remote control.

7. You can now determine whether the set voltage should be saved as fixed voltage or as control voltage:

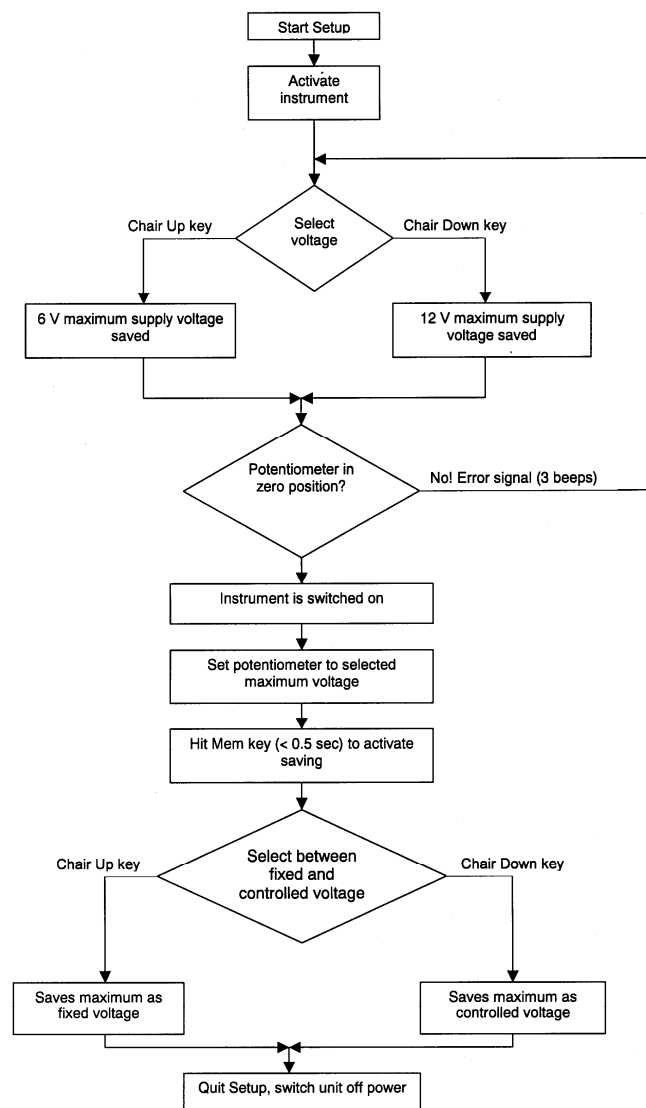
- a) Press the “chair up” key/button for selecting a fixed voltage, i.e. the set voltage will be automatically set upon activating the device irrespective of the position the potentiometer is in at the moment,
or
b) Press the “chair down” key/button to select a regulated voltage, i.e. a set voltage can be regulated with the potentiometer (maximum is reached, if turned to the right as far as it will go).

The setting has been successful if you hear a long signal tone.

8. To save all values, switch off the refraction unit.



The programming process may be interrupted any time by switching off the refraction unit. If the programming process is not finished, the parameters will not be saved.



8 Maintenance and care

8.1 Care



Clean the refraction unit with a clean and damp chamois leather. Do not use any abrasive or aggressive cleaning fluids!



Please use Unisepta® Foam for regular cleaning and disinfection of contact surfaces and areas. Unisepta® Foam is a ready to use cleaning and disinfection foam for leather materials. Spray the foam onto the surface to be treated and rub in the foam evenly. The action time is 5 minutes. Unisepta® Foam is available at authorized shops for cleaning and disinfection.

8.2 Maintenance

The refraction unit if used appropriately does not require any regular maintenance. For repairs or in the event of technical problems please contact the customer care team at bon Optic.

8.3 Do-it-yourself repairs

You may do the following repairs yourself:

8.3.1 Changing the fluorescent medium of the work lamp



Used lamp: Halogen reflector lamp with reflector and safety glass
(12 V / 20 W), base GU 5.3



- 1) Before doing any repairs, always pull out the power plug.
- 2) To avoid burns, always wait until the lamp has cooled down before replacing it.
- 3) Pull out the lamp from the lamp holder.
- 4) Insert the new lamp into the lamp holder. Ensure that the contact pins of the new lamp do not warp. The polarization of the contact pins is irrelevant.

8.3.2 Changing batteries/initialising the remote control

When the red control lamp on the remote control does not light up after it has been pressed, the battery is empty. After the battery has been replaced, the remote control must be re-initialised.

1. In order to replace the battery, open the battery case on the back of the remote control.
2. Press the keys/buttons  → exchangeable table “forward” → 
3. The remote control has now been initialised.

8.3.3 Changing a fuse



Only use fuses indicated in table 1 with the listed type (T) fuse values.



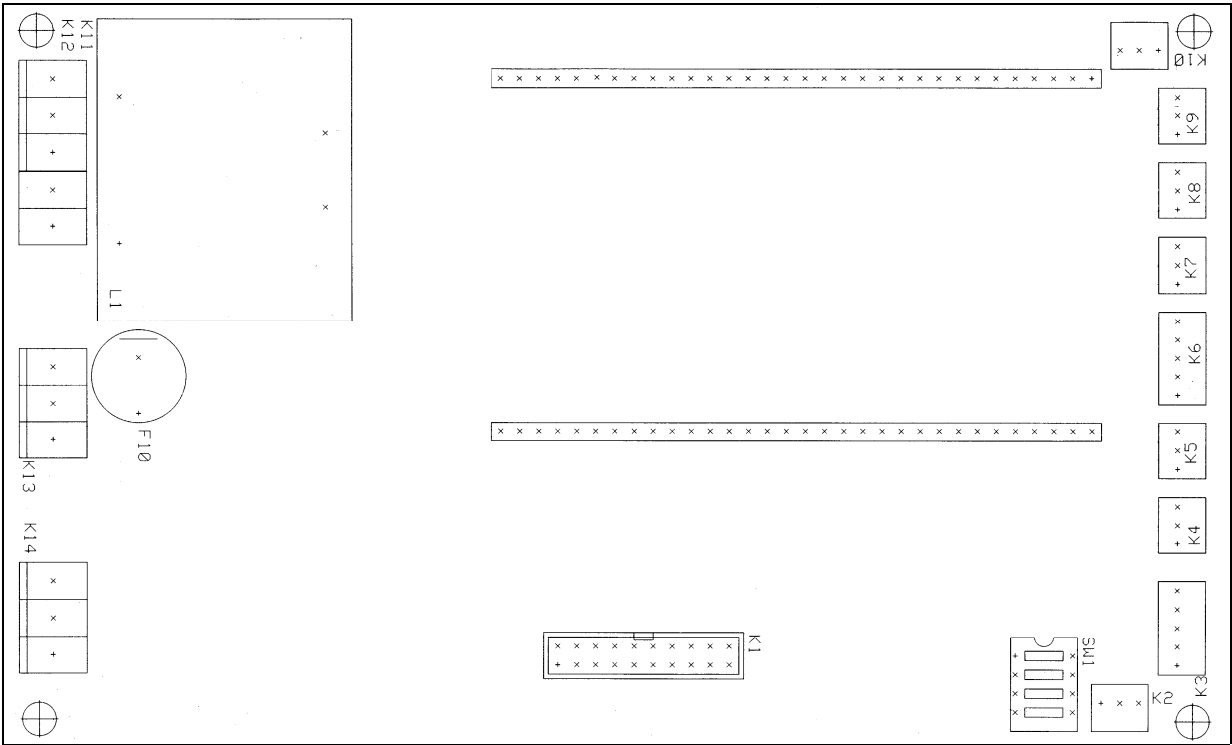
Before replacing a fuse, always pull out the mains plug or disconnect the refraction unit by pressing the on/off-switch of the wall terminal box. Ensure that the refraction unit is cut off from the electric supply. To reach fuses F3-F10 and F13, open the electric component casing of the refraction unit underneath the work table by turning the knurled screws. When you undo the screws, hold the casing fast with one hand. To reach the circuit boards, hinge down the casing carefully.

Component	Fuse	Fuse value/A	Location
Refraction unit	F1	6.3	Main fuses of refraction unit on mains (w/o wall terminal box) Fuses are on wall terminal box in versions with wall terminal box.
Refraction unit	F2	6.3	
Examination chair	F3	3.15	Circuit board 2
Ambient light	F4	5	Circuit board 2
Main transformer	F5	5	Circuit board 2
Supply voltage	F6	1	Circuit board 2
Table and hand-held devices	F7	8	Circuit board 2
Motors	F8	3.15	Circuit board 2
Spotlight	F9	3.15	Circuit board 2
Digital board	F10	1.0	Circuit board 1
Wall terminal box	F11	1.0	Wall terminal box if available
6 Vpower pack (wall terminal box)	F12	0.5	Wall terminal box if available (option)
Dimmer	F13	2	Protection casing for electric components in dimmer

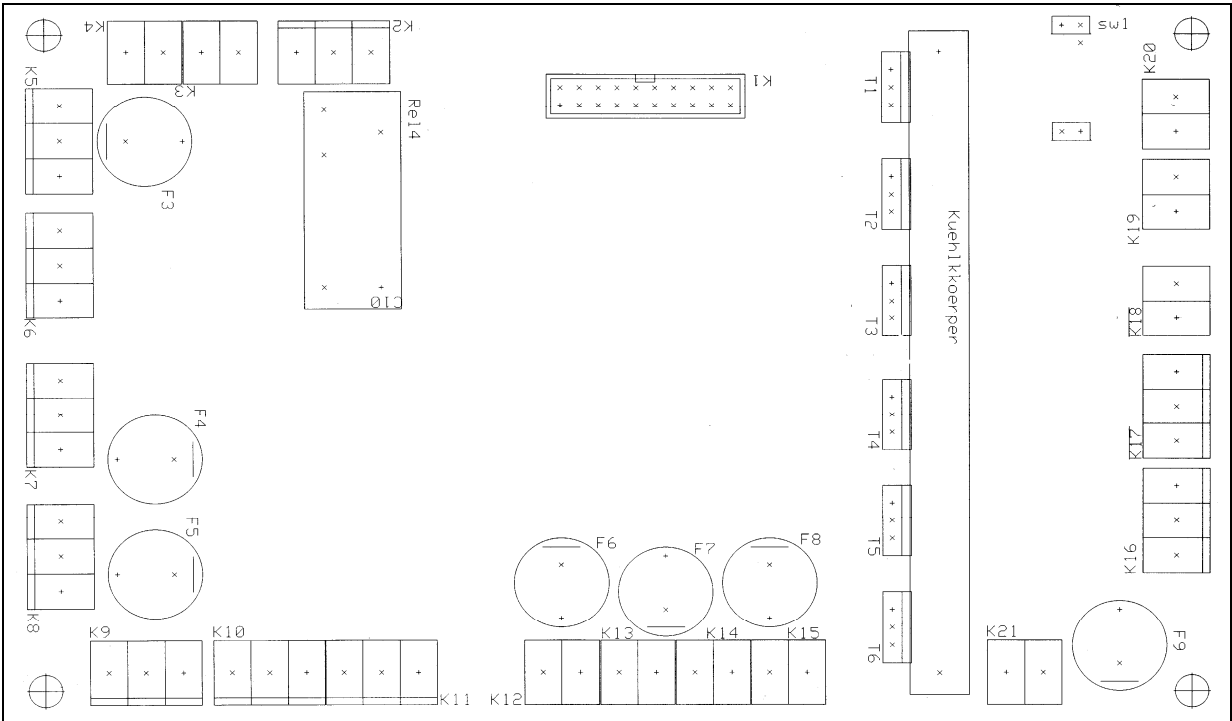
Table 1: Fuses of refraction unit

On the next page, the fuse locations on the circuit board are indicated.

Circuit board 1



Circuit board 2



9 Guarantee

Should defects as the result of material or production errors occur within 24 months of purchase, we guarantee free-of-charge repair of the refraction unit or we will decide whether to off you a free exchange, provided that:

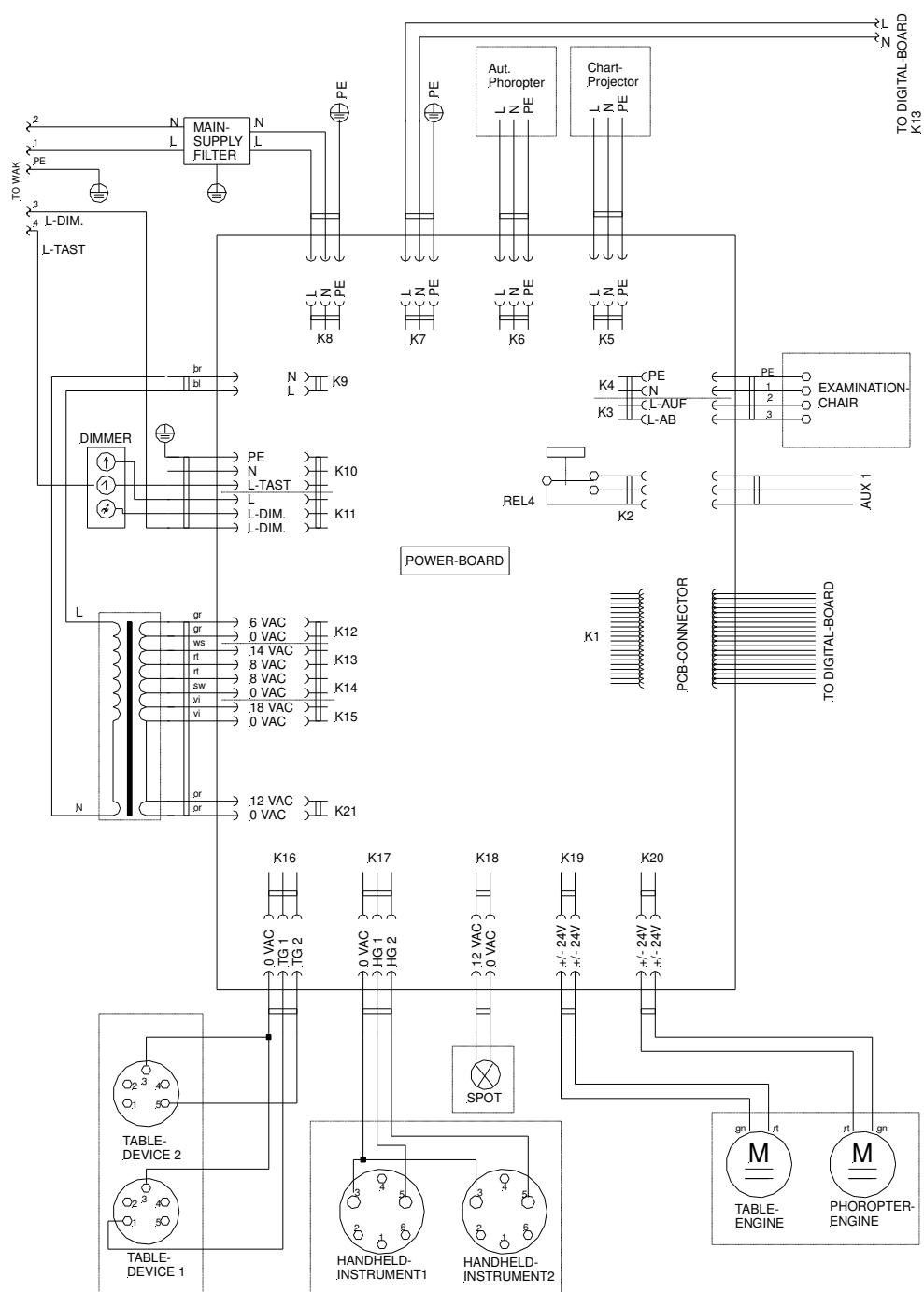
- A receipt with the date of purchase can be provided.
- The device has been used properly and in accordance with the conditions of use.
- Repairs have not been carried out by anyone other than the bon Optic customer service team or persons authorised by bon Optic.

Guarantee services do not result in extension of the guarantee, nor do they represent the start of the new guarantee. The sales guarantee is not applicable to consumables.

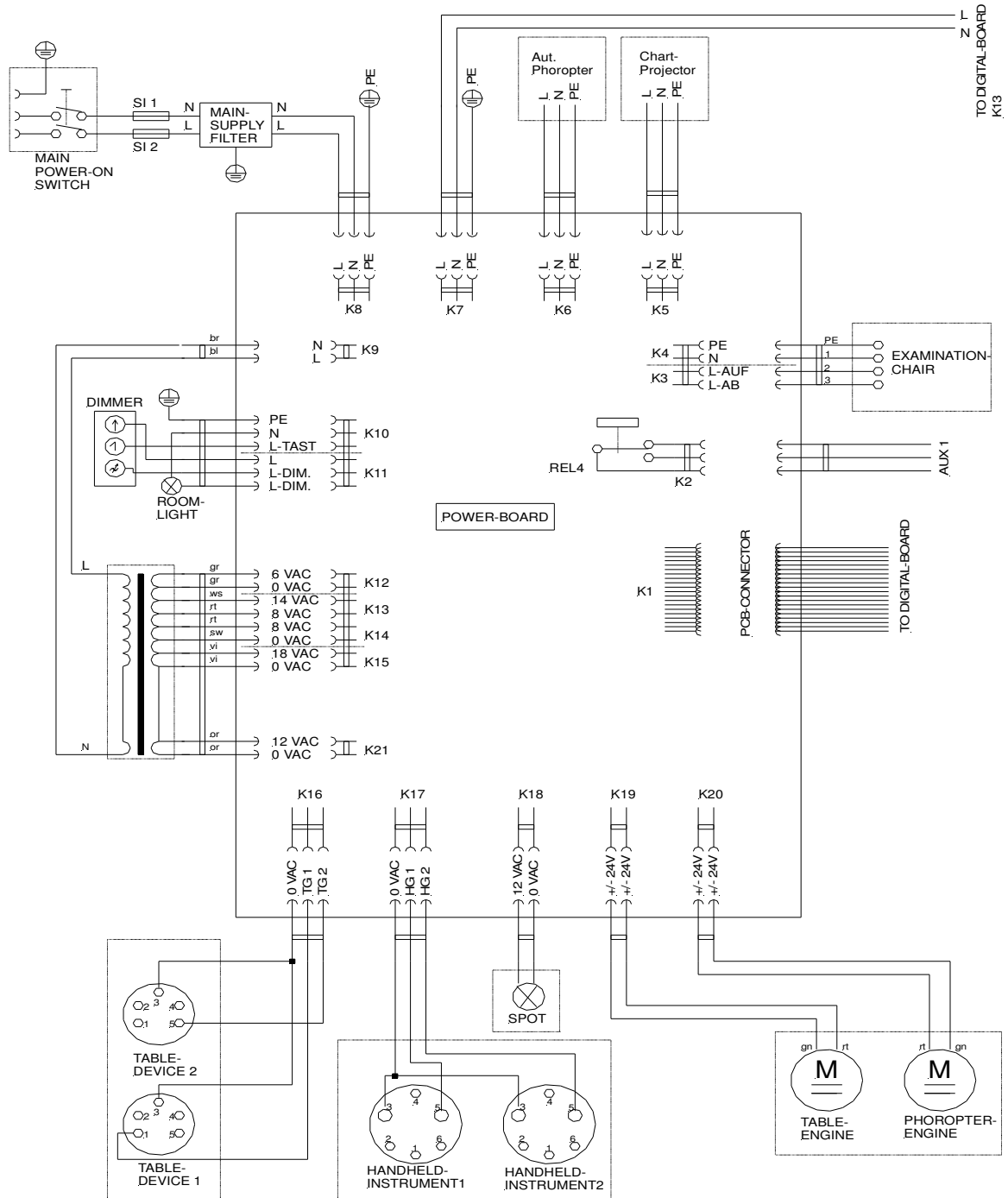
The terms and conditions of trade of bon Optic also apply.

10 Circuit plans/technical data

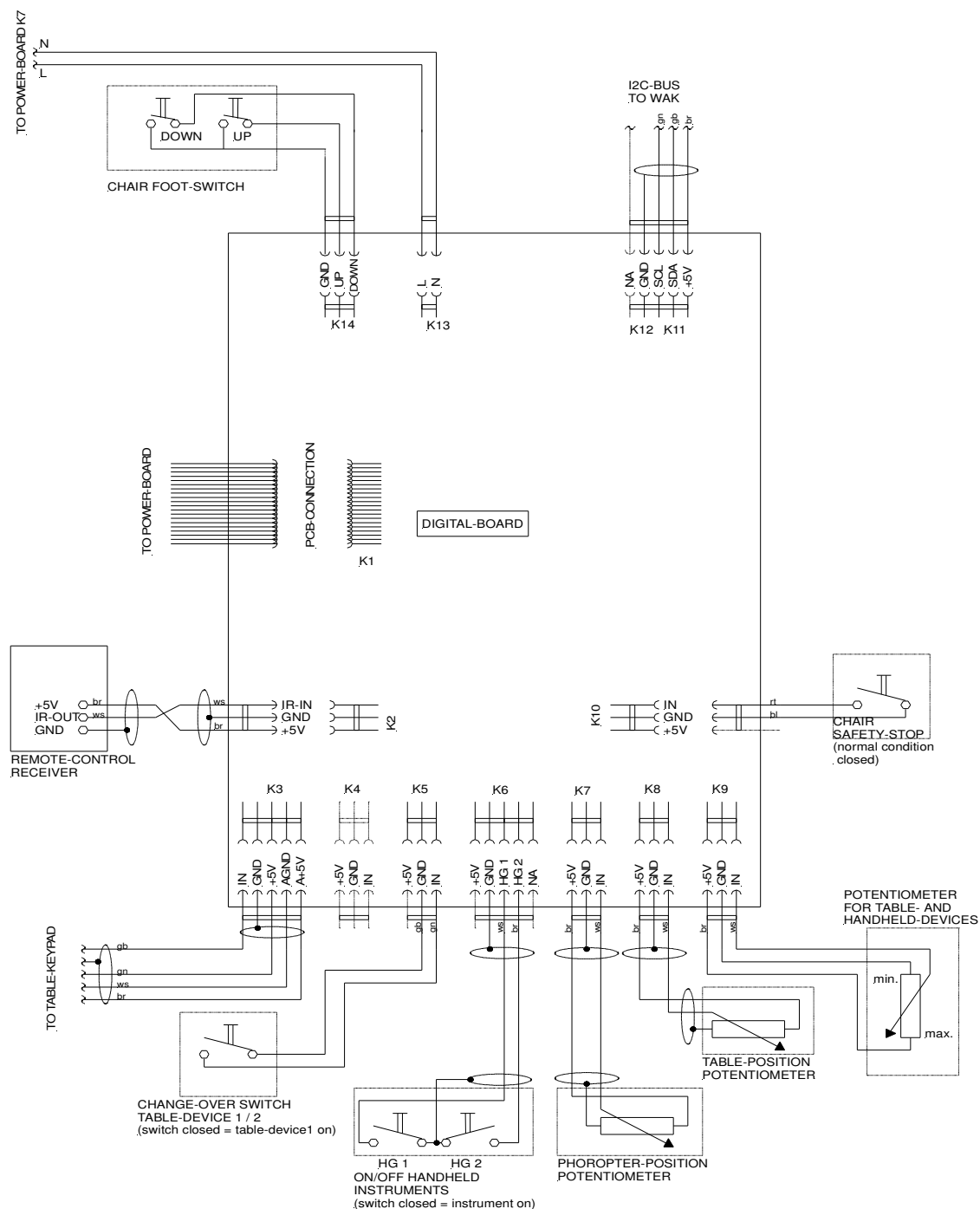
Circuit plan of power board with wall terminal box



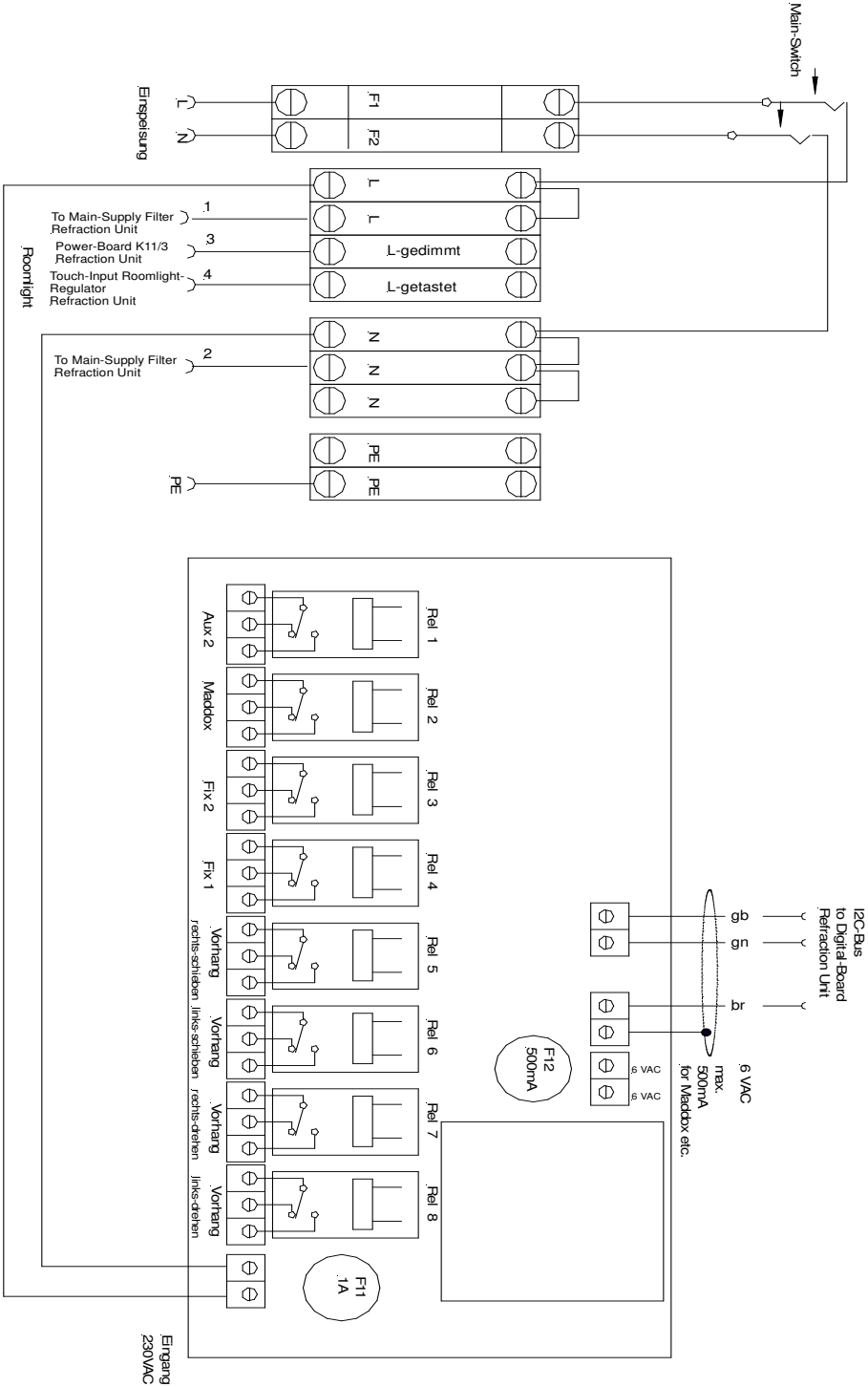
Circuit plan of power board without wall terminal box

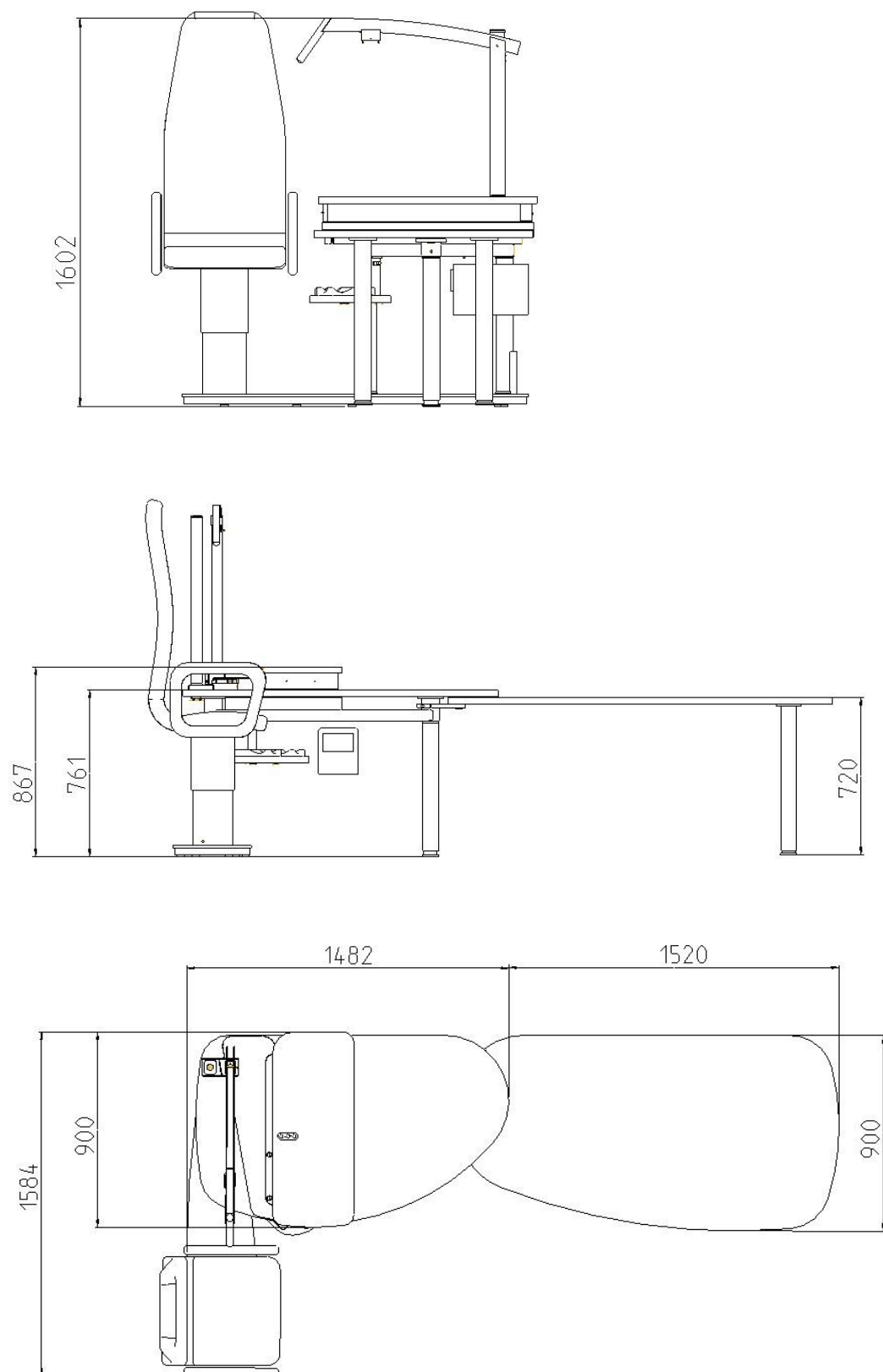


Circuit plan of digital board



Circuit plan of wall terminal box





Weight	
Maximum scope of equipment without devices	approx. 200 kg
Electrical data of refraction unit	
Mains voltage	230 V AC
Mains frequency	50 / 60 Hz
Connected load	750 VA
Workstation lamp	12 V AC / 20 W
Protection class	I
Type of device	B
Protection type	IP 21

Operating conditions for refraction unit	
Environmental temperature	+10° C to + 40° C
Relative humidity	from 30% to 75%
Air pressure	700 hPa to 1060 hPa

Chair Elevation	
Current supply	230 V / 50 Hz
Power intake	2,2 A
Protection class	I
Max. axial strain	1800 N (ca. 170 kg)
ED (Switch in duration chair column)	S2 10% Basic 10 min.
Elevation	215 mm
Speed under strain	ca. 16 mm/s
Thermoswitch	Yes
End switch up/down	Yes

**Disposal of old Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collection programs)**

This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment.
If you have any further questions, please contact bon optic.

Should EMC disruptions (electro-magnetic compatibilty) occur, please contact bon Optic customer support.

Label Symbols	
	Fuse
	Read instruction manual
	Application part type B

Transport requirements	
	Temperature: -5 °C to +45 °C (+23 °F to +113 °F)
	Air pressure: 650 hPa to 1100 hPa
	Relative humidity: 25% to 80%
Maximum conditions – no longer than 60 days in a row	

EU - KONFORMITÄTSERKLÄRUNG EC - DECLARATION OF CONFORMITY

Hersteller-Adresse:
(Manufacturer adress)

bon
Optic Vertriebsgesellschaft mbH
Stellmacherstraße 14
D-23556 Lübeck

Gerätetyp / UMDNS-CODE:
(Device typ/ UMDNS-CODE)

Untersuchungs-/Behandlungsplatz (18-014)
Refraction unit (18-014)

Gerätebezeichnung:
(Device name)

E-40

Klassifizierung:
(Classification)

1 (Richtlinie 93/42/EWG, Anhang IX, Regel 12)
1 (MDD 93/42/EEC, annex IX, rule 12)

Wir erklären hiermit die Übereinstimmung des vorgenannten Produkts mit der EU-Richtlinie 93/42/EWG über Medizinprodukte.

We declare the compliance of the device with the requirements of the Directive 93/42/EEC about medical devices.

Angewandete Normen:
(Applicable standards)

DIN EN 60601-1 (VDE 0750-1) : 2007-07
DIN EN 60601-1-2 (VDE 0750-1-2) : 2007-12
DIN EN ISO 14971 : 2009-10

Das Gerät ist gekennzeichnet mit / The device is marked with



Lübeck, den 02. August 2010



(H. Jochen Kaber, Geschäftsführer)